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(54) **Steering lock and ignition assembly**

Lenkschloss und Zündungsvorrichtung

Verrou de direction et dispositif d'allumage

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Description

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] The present invention is directed to a steering lock and ignition assembly which can be used with a system which indirectly activates an ignition assembly such as by a user identification and authorization system. The steering lock and ignition assembly does not use a conventional mechanical key. In particular, the steering lock and ignition assembly has a two position knob for operating a conventional ignition switch and steering lock mechanism.

DESCRIPTION OF THE PRIOR ART

[0002] The prior art steering lock and ignition assemblies are well known and use a conventional mechanical key.

[0003] In this conventional key system, the user of the vehicle must carry a conventional metal key which enables him to operate the ignition switch as well as unlock other devices such as the vehicle doors, the glove box, and the trunk. If the key is lost or stolen, the user will not have access to the vehicle. If the owner's key operates all the vehicle locks, and the owner then gives his key to a third party such as a driver or valet, that person will have access to all the vehicle locks. Furthermore, if the driver gives his key to a non-driver such as a child, so that the non-driver can enter the vehicle, the non-driver can then insert the key into the ignition, start the vehicle and drive the vehicle.

[0004] Thus, the prior art systems require the carrying of a key which can be lost, misplaced or damaged. Furthermore, the prior art systems do not identify a particular person and therefore provide a level of access or authorization to the person who possesses the key.

[0005] From JP-A-56138047 there is known a steering lock and ignition assembly which comprises a manually operable knob rotatable between a first rotational position and a second rotational position. In the first rotational position, a steering wheel of a vehicle equipped with the steering lock and ignition assembly is locked. Also, a latch pin operable by a solenoid engages into a locking recess of a rotator coupled to the knob. Through proper identification of a user of the vehicle, the solenoid is activated so as to disengage the latch pin from the rotator. Then, the knob can be turned into the second rotational position in which an ignition switch is operated so as to start the engine of the vehicle.

SUMMARY OF THE INVENTION

[0006] It is a primary bject f th pres nt invention to provid a st ering lock and igniti n ass mbly which do s not require a conv nti nal metal k y f r operation.

[0007] It is still another obj ct of th pres nt inv ntion in which th st ring lock and ignition ass mbly has a knob which can be ext nded or retract d such that in the retract d position, the vehicle can not b started and the steering assembly is locked whereas in the extended position, the ignition switch can be operated and the steering assembly unlocked.

[0008] It is still another object of the present invention to provide a steering lock and ignition assembly in which the knob can be rotated relative to a housing.

[0009] It is still another object of the present invention to provide a steering lock and ignition assembly which inhibits rotation of the knob until the knob is extended.

[0010] It is still another object of the present invention to provide a steering lock and ignition assembly having a latch for holding the knob in a retracted position.

[0011] It is still another object of the present invention to provide a steering lock and ignition assembly in which the latch includes a solenoid and a displaceable pin which releasably engages the knob.

[0012] It is still a further object of the present invention to provide a steering lock and ignition assembly which can be used with a keyless vehicle operation identification and authorization system which positively identifies the operator of the vehicle.

[0013] It is a further object of the present invention to provide a steering lock and ignition assembly which is used with a keyless vehicle operation identification and authorization system which identifies the owner or primary operator of the vehicle by means of a biometric characteristic such as a user's fingerprint, retina or voice.

[0014] The present invention provides a steering lock and ignition assembly according to claim 1. Preferred embodiments are defined in the subclaims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Fig. 1 is a side view of the steering lock and ignition assembly with a knob in a retracted position.

[0016] Fig. 2 is a sectional view of the steering lock and ignition assembly with the knob in the extended position.

[0017] Fig. 3 is an end view of the knob in the extended lock position.

[0018] Fig. 4 is a simplified perspective view showing a retraction prevention feature of the present invention.

[0019] Fig. 5 is a front view showing the retraction prevention plate and the retraction tab on the ignition knob.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0020] Referring to Figs. 1-3, the steering lock and ignition assembly comprises a housing 5, an ignition knob 1, spring 6, solenoid 2, stopper pin 3, and indicati n plate 16. The ignition knob 1 is mounted on a shaft 4. The shaft 4 allows the ignition kn b 1 t ext nd from and

retract into the housing and to r tate. The shaft also interconn cts th ignition knob with th igniti n switch 8 and st ring lock ass mbly 7.

[0021] In th secur position as sh wn in Fig. 1, the steering lock and ignition assembly is secured since the ignition knob 1 is retracted into the housing 5 so that an ignition switch 8 cannot be activated. The ignition switch 8 is conventionally known and therefore not shown in detail. The ignition knob 1 is in the LOCK position 12 such that a steering lock assembly 7 is locked and cannot be rotated. The steering lock assembly 7 is conventionally known assembly and therefore is not shown in detail. The ignition knob 1 is held in place by stopper pin 3 which is extended and inserted into recess 1a of ignition knob 1. The solenoid 2 is in a deenergized state when stopper pin 3 is extended.

[0022] When a user identification and authorization system, a remote signal transmitter or code from a keypad provides authorization for the ignition switch 8 to be activated (i.e., when the user of the vehicle has authorization to start and drive the vehicle), switch 11 is closed and power from battery 10 is applied to solenoid 2. The solenoid 2 is energized and stopper pin 3 of solenoid 2 is pulled in by a magnetic force of the solenoid (see Fig. 2). Since the stopper pin 3 no longer engages recess 1a of the ignition knob 1, the ignition knob 1 is pushed by the force of spring 6 into a projected or extended position.

[0023] Once the ignition knob 1 is extended through the indicator plate 16 by spring 6, the solenoid 2 is deenergized and the stopper pin 3 of the solenoid is moved down by the force of a spring (not shown) inside solenoid 2. Thus, with the ignition knob 1 now extended, the steering lock assembly 7 can now be unlocked and the vehicle started by activating the ignition switch 8.

[0024] In order to unlock the steering lock assembly 7, the ignition knob 1 must be rotated from the LOCK position 12 shown in Fig. 3 to the ACC position 13. Ignition knob 1 has a means which allows the ignition knob 1 to rotate passed a stop engagement member 9 from the LOCK position 12 to the ACC position 13. When the ignition knob 1 is turned from the LOCK position 12 to the ACC position 13, the steering lock assembly 7 is unlocked. Furthermore, the steering lock assembly 7 is retained in the unlocked position until the ignition knob 1 is completely pushed into the housing 5. Thus, accidental locking of the steering lock assembly 7 can be avoided. Furthermore, with the ignition knob 1 in the ACC position 13, the vehicle battery 10 is connected to the vehicle accessories to provide power thereto such as the radio, windows, etc. as in a conventional metal key system.

[0025] The steering lock assembly 7 remains in the same unlocked position when the ignition knob 1 is turned from the ACC position 13 to the ON position 14 or is turn d from th ON position 14 to th START position 15. Thus, the st ring lock ass mbly 7 r mains unlocked.

[0026] The v hicle can be start d by rotating th ignition knob 1 from the ACC position 13 to th START positi n 15 such that the igniti n switch 8 is activated. Aft r starting the vehicle, the ignition knob 1 is r leased by the driver and the ignition knob 1 returns to the ON position 14 as is conventional with a metal key system. In the START position 15, the vehicle battery 10 provides power to the ignition switch 8 and start switch (not shown). In the ON position 14, the vehicle battery 10 provides power to the vehicle accessories and ignition switch 8.

[0027] When the driver of the vehicle wishes to stop and park the vehicle, the ignition knob 1 is turned counter clockwise from the ON position 14 to the ACC position 13. The steering lock assembly 7 remains in the unlocked position. The ignition knob 1 cannot be retracted into the housing 5 until a retraction tab 9 oh the ignition knob 1 is aligned with the notch 30 of a retraction prevention plate 31. In the ACC, ON and START positions, the tab 9 is in abutment with the retention plate 31. The ignition knob 1 cannot be retracted until it is rotated to the LOCK position 12 where the tab 9 and the notch 30 are in alignment. Only then can the ignition knob 1 be pushed into the housing 5 flush with the face of the indication plate 16. When the ignition knob 1 enters into the housing 5 completely, the steering lock assembly 7 finally locks the steering shaft against rotation Furthermore, the stopper pin 3 snaps into the recess 1a of the ignition knob 1 so as to retain the ignition knob 1 within the housing 5 until the solenoid 2 is again energized.

[0028] With the steering lock and ignition assembly of the present invention, a vehicle can be started without using a conventional key which can be lost, misplaced or damaged.

[0029] While the steering lock and ignition assembly of the present invention may be activated by a signal from a remote transmitter or code from a keypad, the present invention may be used with a keyless authorization system which identifies the owner or primary operator by means of a biometric characteristic such as a user's fingerprint, retina or voice.

[0030] The presently disclosed embodiments are be considered in all respects as illustrative and not restrictive, the scope of the invention being defined by the appended claims.

[0031] A steering lock and ignition assembly has a two position knob for operating an ignition switch of a vehicle and for operating a steering lock mechanism of the vehicle. The knob is retained within a housing by a latch device until authorization by an authorization system is provided to the latch device. When authorization is received, the latch device releases the knob from the housing so that the steering lock mechanism can unlock the steering shaft and the ignition switch can be operated to start the vehicle.–

Claims

1. A steering lock and ignition assembly comprising:

   a housing (5);
   an ignition means (8) for starting a vehicle;
   a lock means (7) for locking a steering shaft of the vehicle;
   movable knob means (1) for retracting into said housing (5), for extending out of said housing (5) and for rotating about an axis of said housing (5) when extended, said movable knob means (1) being connected to said ignition means (8) when rotated to a first position and being connected to said lock means (7) when rotated to a second position and retracted into said housing (5).

2. A steering lock and ignition assembly according to claim 1, wherein said movable knob means (1) includes latch means (1a, 2, 3) for holding said movable knob (1) means flush to said housing (5) when retracted into said housing (5).

3. A steering lock and ignition assembly according to claim 2, wherein said latch means (1a, 2, 3) includes a solenoid (2), a pin (3) displaceable by said solenoid (2) and a recess (1a) provided in said movable knob means (1), wherein said pin (3) releasably engages said recess (1a) in said movable knob means (1) when said movable knob means (1) is in a retracted position.

4. A steering lock and ignition assembly according to claim 2 or 3, wherein said latch means (1a, 2, 3) is activated by a user authorization system.

5. A steering lock and ignition assembly according to anyone of claims 1 to 4, wherein said movable knob means (1) includes a knob (1) and a stop (3) for preventing said knob (1) from rotating when retracted.

6. A steering lock and ignition assembly according to anyone of claims 1 to 5, further comprising a spring (6) for biasing said movable knob means (1) to extend from said housing (5).

7. A steering lock and ignition assembly according to anyone of claims 1 to 6, wherein said first position is a start position for starting the vehicle and said second position is a lock position for locking said lock means (7).

8. A steering lock and ignition assembly according to claim 7, wherein said movable knob means (1) further rotates to an accessory position for providing power to accessories of the vehicle and for unlocking said lock means (7) when said movable knob means (1) is extended and rotated from the lock position.

9. A steering lock and ignition assembly according to anyone of claims 4 to 8, wherein said user authorization system is a keyless system using a biometric characteristic.

Patentansprüche

1. Lenkschloß- und Zündungsbaueinheit, die umfaßt:

   ein Gehäuse (5);
   ein Zündungsmittel (8) zum Anlassen eines Fahrzeugs;
   ein Verriegelungsmittel (7) zum Verriegeln einer Lenkwelle des Fahrzeugs;
   ein bewegliches Knopfmittel (1) zum Zurückziehen in das Gehäuse (5), zum Herausziehen aus dem Gehäuse (5) und zum Drehen um eine Achse des Gehäuses (5), wenn es herausgezogen ist, wobei das bewegliche Knopfmittel (1) mit dem Zündungsmittel (8) verbunden ist, wenn es in eine erste Position gedreht ist, und mit dem Verriegelungsmittel (7) verbunden ist, wenn es in eine zweite Position gedreht und in das Gehäuse (5) zurückgezogen ist.

2. Lenkschloß- und Zündungsbaueinheit nach Anspruch 1, in der das bewegliche Knopfmittel (1) ein Riegelmittel (1a, 2, 3) enthält, um das beweglich Knopfmittel (1) bündig mit dem Gehäuse (5) zu halten, wenn dieses in das Gehäuse (5) zurückgezogen ist.

3. Lenkschloß- und Zündungsbaueinheit nach Anspruch 2, in der das Riegelmittel (1a, 2, 3) einen Elektromagneten (2), einen durch den Elektromagneten (2) verschiebbaren Stift (3) und eine im beweglichen Knopfmittel (1) vorgesehene Aussparung (1a) umfaßt, wobei der Stift (3) lösbar in di Aussparung (1a) im beweglichen Knopfmittel (1) eingreift, wenn sich das bewegliche Knopfmittel (1) in einer zurückgezogenen Position befindet.

4. Lenkschloß- und Zündungsbaueinheit nach Anspruch 2 oder 3, in der das Riegelmittel (1a, 2, 3) durch ein Benutzerautorisierungssystem aktiviert wird.

5. Lenkschloß- und Zündungsbaueinheit nach irgendeinem der Ansprüche 1 bis 4, in der das beweglich Knopfmittel (1) einen Knopf (2) und einen Anschlag (3) enthält, um den Knopf (1) an einer Drehung zu hindern, wenn er zurückgezogen ist.

6. Lenkschloß- und Zündungsbaueinheit nach irgend-

einem der Ansprüch 1 bis 5, die ferner eine F der (6) umfaßt, um das b w gliche Knopfmitt l (1) v r-zubelasten, um es aus dem Gehäuse (5) herauszudrück n.

7. Lenkschloß- und Zündungsbaueinheit nach irgendeinem der Ansprüche 1 bis 6, in der die erste Position eine Anlaßposition zum Anlassen des Fahrzeugs ist und die zweite Position eine Verriegelungsposition zum Verriegeln des Verriegelungsmittels (7) ist.

8. Lenkschloß- und Zündungsbaueinheit nach Anspruch 7, in der das bewegliche Knopfmittel (1) ferner in eine Zusatzgeräteposition gedreht wird, um Strom zu den Zusatzgeräten des Fahrzeuges zu liefern und das Verriegelungsmittel (7) zu entriegeln, wenn das bewegliche Knopfmittel (1) herausgezogen ist und aus der Verriegelungsposition gedreht wird.

9. Lenkschloß- und Zündungsbaueinheit nach irgendeinem der Ansprüche 4 bis 8, in der das Benutzerautorisierungssystem ein schlüsselloses System ist, das ein biometrisches Merkmal verwendet.

Revendications

1. Verrou de direction et d'allumage pour véhicule comprenant :

   un boîtier(5) ;
   un dispositif d'allumage(8) pour démarrer le véhicule ;
   un moyen de blocage (7) pour bloquer l'arbre de direction du véhicule ;
   des moyens (1) sous forme d'un bouton mobile capable de se rétracter vers l'intérieur dudit boîtier (5), de s'étendre vers l'extérieur dudit boîtier (5) et de tourner, en position d'extension, autour d'un axe dudit boîtier (5), ledit moyen (1) sous forme d'un bouton mobile étant connecté auxdits moyens (8) d'allumage lorsqu'il est positionné en rotation à une première position et étant connecté auxdits moyens (7) de blocage lorsqu'il est positionné en rotation à une seconde position et rétracté dans ledit boîtier (5).

2. Verrou de direction et d'allumage pour véhicule suivant la revendication 1, dans lequel lesdits moyens (1) formant bouton mobile comportent des moyens de verrouillage (1a,2,3) pour maintenir lesdits moyens (1) au ras de la surface dudit boîtier (5) lorsqu'ils sont rétractés dans le dit boîtier.

3. Verrou d direction t d'allumag pour véhicule suivant la r v ndication 2, dans l quel l sdits moyens d verrouillage (1a,2,3) comprennent un solénoïde (2), un rg t (3) acti nné par l dit sol´noïde (2) et un log ment (1a) ménagé dans lesdits moyens (1) f rmant bout n mobile, dans l quel le dit ergot (3) s'engage de façon réversible dans ledit logement (1a) ménagé dans lesdits moyens (1) formant bouton mobile lorsque lesdits moyens (1) formant bouton mobile, sont en position rétractée.

4. Verrou de direction et d'allumage pour véhicule suivant la revendication 2 ou la revendication 3, dans lequel le système de verrouillage (1a, 2, 3) est actionné par un système d'habilitation de l'utilisateur.

5. Verrou de direction et d'allumage pour véhicule suivant l'une des revendications 1 à 4, dans lequel lesdits moyens (1) formant bouton mobile, comportent un bouton (1) et une butée (3) pour empêcher ledit bouton (1) de tourner lorsqu'il est en position rétractée.

6. Verrou de direction et d'allumage pour véhicule suivant l'une des revendications 1 à 5, comprenant en outre un ressort (6) pour empêcher lesdits moyens (1) formant bouton mobile, de sortir du dit boîtier (5).

7. Verrou de direction et d'allumage pour véhicule suivant l'une des revendications 1 à 6, dans lequel ladite première position est une position de démarrage du véhicule pour démarrer le véhicule et ladit seconde position est une position de blocage desdits moyens de blocage (7).

8. Verrou de direction et d'allumage pour véhicule suivant la revendications 7, dans lequel lesdits moyens (1) peuvent aussi se placer sur une position d'accessoire pour délivrer une alimentation électrique à des accessoires du véhicule et pour débloquer lesdits moyens de blocage (7) lorsque les moyens (1) formant bouton mobile, sont en position d'extension et de rotation au-delà de la position de verrouillage.

9. Verrou de direction et d'allumage pour véhicule suivant l'une des revendications 4 à 8, dans lequel ledit système d'autorisation de l'utilisateur est un système sans clé de contact qui utilise une caractéristique biométrique.

Fig. 1

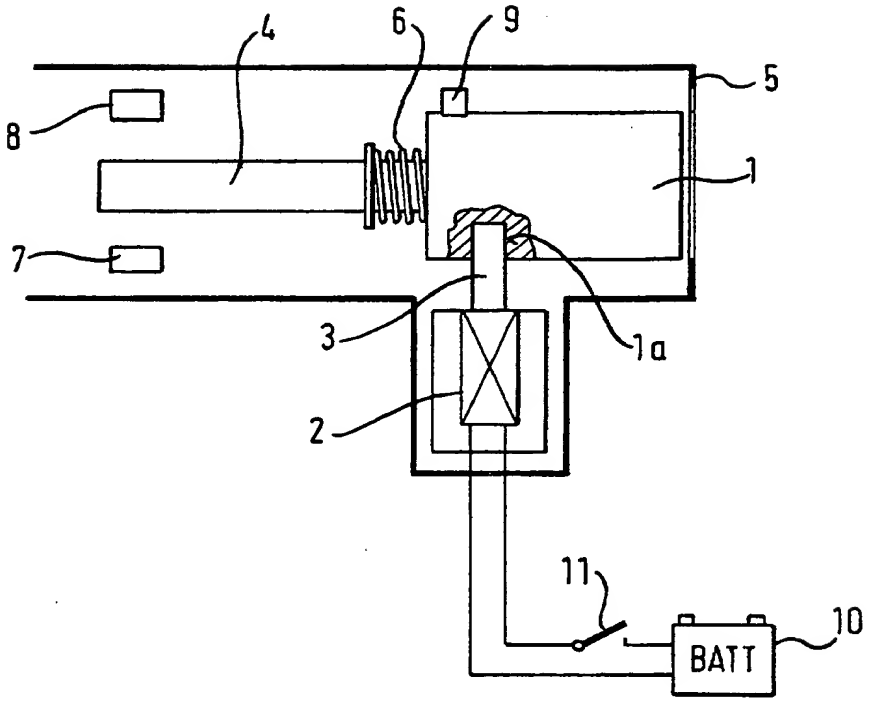

Fig. 2

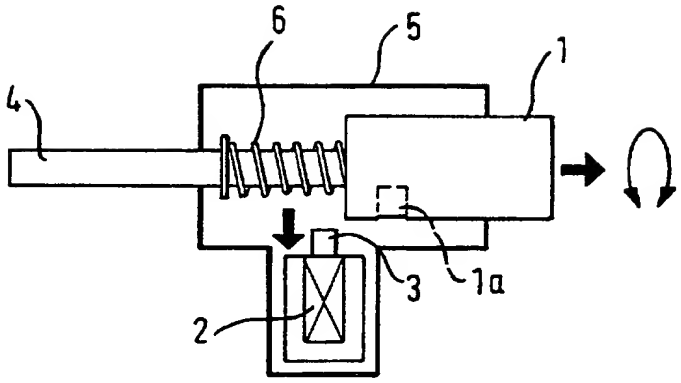

Fig. 3

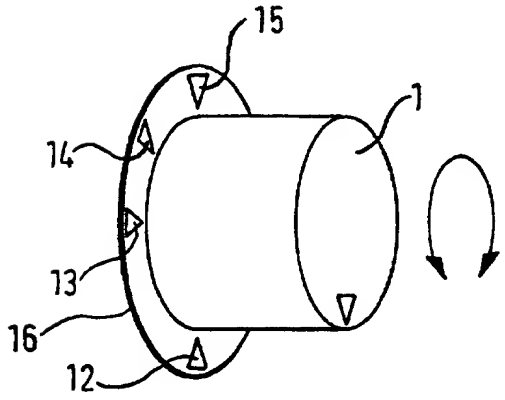

Fig. 4

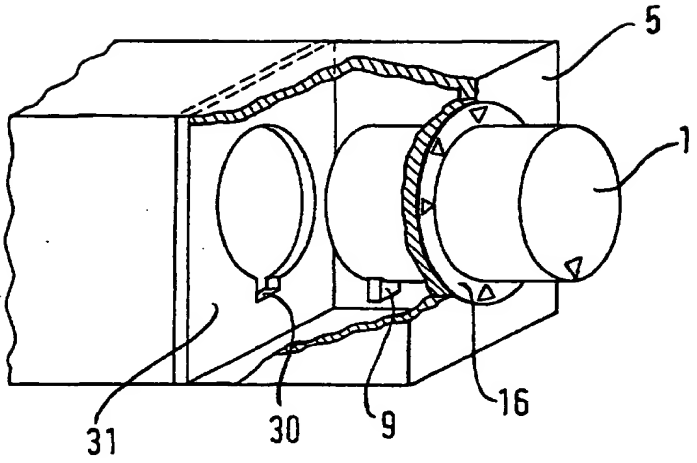

Fig. 5